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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/634,876

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Hideki Iwata

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EXAMINER

ROJAS, BERNARD

ART UNIT

PAPER NUMBER

2832

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DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/634,876

Applicant(s)

IWATA ET AL.

Examiner

Bernard Rojas

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 28 February 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,5-8,10,11,15,18,22,24,27,30-38,40,43,44,46 and 68 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,5-11,15,18,22,24,27,30-38,40 and 68 is/are rejected.
- 7) ☒ Claim(s) 43,44 and 46 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Arguments

Applicant's arguments with respect to the pending claims have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 6-8, 15, 22, 24, 27, 40, 30-36 and 68 are rejected under 35 U.S.C. 102(e) as being anticipated by Hyman et al. [6,504,118].

Claim 15, Hyman et al. discloses a device [figure 12 and 13] comprising: a first substrate [302] having stationary contacts [322] and a stationary electrode [317,367]; a second substrate [334] arranged so as to face the first substrate; and a movable plate [309, 359, 389] arranged between the first and second substrates, the movable plate comprising a frame [301] sandwiched between the first and second substrates to realize a hermetical sealed structure, and a movable portion and a plurality of elastically deformable members [the ends of each armatures 309, 359, 389 that are attached to the frame, 310, 360, 390 respectively] the movable portion having a movable electrode

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[316,365] facing the stationary electrode, and a movable contact [320] facing the stationary contacts, the movable portion moving between the first and second substrates due to electrostatic attraction that develops between the movable electrode and the stationary electrode wherein the frame has a portion [301] that restricts in-plane movement of the movable portion.

Claims 24, 27 and 30, Hyman et al. discloses a device [figures 12 and 13] comprising: a first substrate [302] having stationary contacts [322] and a stationary electrode [317,367]; a second substrate [334] with a second electrode 344, 394] and a second stationary contact [339] arranged so as to face the first substrate; and a movable plate [309, 359, 389] arranged between the first and second substrates, the movable plate comprising a frame [301] sandwiched between the first and second substrates to realize a hermetical sealed structure, and a movable portion and a plurality of elastically deformable members [the ends of each armatures 309, 359, 389 that are attached to the frame, 310, 360, 390 respectively] the movable portion having a movable electrode [316,365] facing the stationary electrode, and multiple movable contact [320] facing the stationary contacts, the movable portion moving between the first and second substrates due to electrostatic attraction that develops between the movable electrode and the stationary electrode.

Claims 31-33 and 34, Hyman et al. discloses a device [figures 12 and 13] comprising: a first substrate [302] having stationary contacts [322] and a stationary electrode [317,367]; a second substrate [334] with a second electrode 344, 394] and a second stationary contact [339] arranged so as to face the first substrate; and a

movable plate [309, 359, 389] arranged between the first and second substrates, the movable plate comprising a frame [301] sandwiched between the first and second substrates to realize a hermetical sealed structure, and a movable portion and a plurality of elastically deformable members [the ends of each armatures 309, 359, 389 that are attached to the frame, 310, 360, 390 respectively] the movable portion having a movable electrode [316,365] facing the stationary electrode, and multiple movable contact [320] facing the stationary contacts, the movable portion moving between the first and second substrates due to electrostatic attraction that develops between the movable electrode and the stationary electrode, wherein the movable contact is separated from the stationary contact of the first and second substrates in the absence of electrostatic attraction [figure 13a] and the movable contact is brought into contact with the stationary contact of the second electrode of the second substrate [not shown] or the stationary contact of the first substrate [figure 13c] due the electrostatic attraction.

Claim 35, Hyman et al. discloses a device [figures 12 and 13] comprising: a first substrate [302] having stationary contacts [322] and a stationary electrode [317,367]; a second substrate [334] with a second electrode 344, 394] and a second stationary contact [339] arranged so as to face the first substrate; and a movable plate [309, 359, 389] arranged between the first and second substrates, the movable plate comprising a frame [301] sandwiched between the first and second substrates to realize a hermetical sealed structure, and a movable portion and a plurality of elastically deformable members [the ends of each armatures 309, 359, 389 that are attached to the frame, 310, 360, 390 respectively] the movable portion having a movable electrode [316,365]

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facing the stationary electrode, and multiple movable contact [320] facing the stationary contacts, the movable portion moving between the first and second substrates due to electrostatic attraction that develops between the movable electrode and the stationary electrode, wherein an interconnection line [345, 395] extending from the stationary electrode is extracted to an outside of the second substrate via a through hole formed in the second substrate [figure 13a].

Claim 36, Hyman et al. discloses a device [figures 12 and 13] comprising: a first substrate [302] having stationary contacts [322] and a stationary electrode [317,367]; a second substrate [334] with a second electrode 344, 394] and a second stationary contact [339] arranged so as to face the first substrate; and a movable plate [309, 359, 389] arranged between the first and second substrates, the movable plate comprising a frame [301] sandwiched between the first and second substrates to realize a hermetical sealed structure, and a movable portion and a plurality of elastically deformable members [the ends of each armatures 309, 359, 389 that are attached to the frame, 310, 360, 390 respectively] the movable portion having a movable electrode [316,365] facing the stationary electrode, and multiple movable contact [320] facing the stationary contacts, the movable portion moving between the first and second substrates due to electrostatic attraction that develops between the movable electrode and the stationary electrode, wherein the second substrate has a second contact [339] and an interconnection line extending from the stationary contact is extracted to an outside of the second substrate via a through hole formed in the second substrate [figure 12].

Claim 68, Hyman et al. discloses a device [figure 12 and 13] comprising: a first substrate [302] having stationary contacts [322] and a stationary electrode [317,367]; a second substrate [334] arranged so as to face the first substrate; and a movable plate [309, 359, 389] arranged between the first and second substrates, the movable plate including a frame [301] sandwiched between the first and second substrates to realize a hermetical sealed structure, and a portion having a movable electrode [316,365] facing the stationary electrode, and a contact [320] facing the stationary contacts and a plurality of elastically deformable members [the ends of each armatures 309, 359, 389 that are attached to the frame, 310, 360, 390 respectively] suspending the portion from the frame [figure 13].

Claims 6 and 7, Hyman et al. teaches providing through holes in the substrate to interconnect the electrodes and the contacts outside of the micro-relay [figures 12 and 13].

Claim 8, Hyman et al. discloses the micro-relay as claimed in claim 68, wherein interconnection lines extending from the first substrate to an outside of the micro-relay are flush with a surface of the first substrate [Fig. 12].

Claim 22, Seki et al. discloses the micro-relay as claimed in claim 68, wherein the second substrate has a flat plate shape [Fig. 13].

Claim 40, Seki et al. discloses the micro-relay as claimed in claim 68, wherein the frame has a thickness that defines spaces between the movable plate and the first stationary contact and between the movable plate and the second stationary contact [Fig. 13].

Claim Rejections - 35 USC § 103

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 5, 8-11, 18, 22, 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hyman et al. [6,504,118] in view of DeReus [US 6,876,482].

Claim 1, Hyman et al. discloses a device [figures 12 and 13] comprising: a first substrate [302] having stationary contacts [322] and a stationary electrode [317,367]; a second substrate [334] arranged so as to face the first substrate; and a movable plate [309, 359, 389] arranged between the first and second substrates, the movable plate comprising a frame [301] sandwiched between the first and second substrates to realize a hermetical sealed structure, and a movable portion and a plurality of elastically

deformable members [the ends of each armatures 309, 359, 389 that are attached to the frame, 310, 360, 390 respectively] the movable portion having a movable electrode [316,365] facing the stationary electrode, and multiple movable contact [320] facing the stationary contacts, the movable portion moving between the first and second substrates due to electrostatic attraction that develops between the movable electrode and the stationary electrode wherein the frame has a portion [301] that restricts in-plane movement of the movable portion.

Hyman et.al. fails to teach that the movable portion has multiple contacts and the stationary contacts have branch portions contactable to the multiple movable contacts.

DeReus teaches a Mem switch [figure 7] with a movable contact portion [714] with multiple contacts [720, 722] that contact the stationary contact branch portions [716, 718].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the contact configuration of DeReus in the micro switch of Hyman et al. in order to reduce the gap distance between movable contacts and stationary contacts, thus reducing the potential for shorting between actuation electrodes; insure reliable contact with stationary contacts because without contact bumps there is a potential for interference between movable contact and the substrate between stationary contact; and to provide design flexibility to meet contact resistance and current capacity requirements [col. 15 line 60 to col. 16 line 10].

Claim 5, Seki et al. discloses the claimed invention with the exception that the stationary contacts that are connectable to the multiple contacts and are provided independently.

DeReus teaches a Mem switch [figure 7] with a movable contact portion [714] with multiple contacts [720, 722] that contact the independent stationary contacts [716, 718].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the contact configuration of DeReus in the micro switch of Hyman et al. in order to reduce the gap distance between movable contacts and stationary contacts, thus reducing the potential for shorting between actuation electrodes; insure reliable contact with stationary contacts because without contact bumps there is a potential for interference between movable contact and the substrate between stationary contact; and to provide design flexibility to meet contact resistance and current capacity requirements [col. 15 line 60 to col. 16 line 10].

Claim 18, Hyman et al. discloses a device [figures 12 and 13] comprising: a first substrate [302] having stationary contacts [322] and a stationary electrode [317, 367]; a second substrate [334] arranged so as to face the first substrate; and a movable plate [309, 359, 389] arranged between the first and second substrates, the movable plate comprising a frame [301] sandwiched between the first and second substrates to realize a hermetical sealed structure, and a movable portion and a plurality of elastically deformable members [the ends of each armatures 309, 359, 389 that are attached to the frame, 310, 360, 390 respectively] the movable portion having a movable electrode

[316,365] facing the stationary electrode, and multiple movable contact [320] facing the stationary contacts, the movable portion moving between the first and second substrates due to electrostatic attraction that develops between the movable electrode and the stationary electrode.

Hyman et al. fails to teach that the movable portion has protrusions that prevent the movable portion from sticking to the first substrate.

DeReus teaches a Mem switch [figure 7] with a movable portion [704] with protrusions [726, 728] that prevent the movable portion from sticking to the first substrate.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the contact configuration of DeReus in the micro switch of Hyman et al. in order to prevent to movable electrode from contacting the stationary electrode [col. 16 lines 60-65].

Claims 37 and 38, Hyman et al. discloses a device [figure 12 and 13] comprising: a first substrate [302] having stationary contacts [322] and a stationary electrode [317,367]; a second substrate [334] arranged so as to face the first substrate; and a movable plate [309, 359, 389] arranged between the first and second substrates, the movable plate comprising a frame [301] sandwiched between the first and second substrates to realize a hermetical sealed structure, and a movable portion and a plurality of elastically deformable members [the ends of each armatures 309, 359, 389 that are attached to the frame, 310, 360, 390 respectively] the movable portion having a movable electrode [316,365] facing the stationary electrode, and a movable contact

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[320] facing the stationary contacts, the movable portion moving between the first and second substrates due to electrostatic attraction that develops between the movable electrode and the stationary electrode wherein the second substrate has a stationary contact [339] facing the movable contact.

Hyman et al. also fails to teach that the movable portion has protrusions that prevent the movable portion from sticking to the first substrate.

DeReus teaches a Mem switch [figure 7] with a movable portion [704] with protrusions [726, 728] that prevent the movable portion from sticking to the first substrate.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the contact configuration of DeReus in the micro switch of Seki et al. in order to prevent to movable electrode from contacting the stationary electrode [col. 16 lines 60-65].

Allowable Subject Matter

Claims 43, 44, 46 are allowed

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bernard Rojas whose telephone number is (571) 272-1998. The examiner can normally be reached on M and W-F, 5:30-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Elvin G. Enad can be reached on (571) 272-1990. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


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